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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
LAY, MICHELLE K	

ART UNIT	PAPER NUMBER
2672	

DATE MAILED: 11/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/058,050	BLYTHE ET AL.	
	Examiner	Art Unit	
	Michelle K. Lay	2672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 July 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5 and 8-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 8-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 May 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7-22-05, 8-23-05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

The amendment filed on 23 August 2005, has been entered and made of record. Claims 1-5, 8--21 are pending. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action.

Response to Arguments

Applicant's arguments with respect to claim 1-21 have been considered but are moot in view of the new ground(s) of rejection.

Information Disclosure Statement

The information disclosure statements (IDS) submitted on 77 July 2005 and 23 August 2005 was filed after the mailing date of the Non-Final Office Action on 22 April 2005. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims **1**, **2**, **9–14**, **20**, **21** rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. US 6,344,852 B1 to Zhu et al.

Zhu et al. teaches the limitations of claims **1**, **2**, **9–14**, **20**, **21** with the exception of disclosing when the bounding region is defined (**1**, **2**, **9–14**, **20**, **21**) and multiple graphics units (claims **11-14**, **20**, **21**). However, Zhu et al. discloses a system and method implemented in hardware to optimize rendering of a computer graphics image, which may be displayed in an image frame comprising a number of tiles.

1. In regards to claims **1** and **2**, Fig. 1 illustrates a graphics system (10) that operates on graphics data that can be used to produce an image on a display device. The graphics data may be generated by dedicated geometry hardware or a central processing unit of a host computer (claim **2**) [column 3, lines 14 – 15]. Graphics data can include geometry data and mode data. Geometry data comprises information relating to various geometries (e.g., triangles, parallelograms, rectangles, circles, etc.) that can be processed to produce a complete image (claim **2**) [column 3, lines 19 – 24]. Fig. 3 illustrates an exemplary frame (38) in which an image can be displayed (claim **1**) [column 12, lines 1 – 2]. This frame is considered the compositing window as claimed. Frame (38) comprises or is divided into a number of regions or tiles (40) (claim **1**). Tiles (40) can be organized into nxm array in frame (38) [column 12, lines 2 – 7]. These tiles are considered the subareas as claimed. Each tile (40) may comprise one or more picture elements ("pixels"), which also may be organized in an array. A portion of the overall image is displayed in each tile (40) [column 12, lines 10 – 14]. One or more

geometries, such as exemplary geometry (42), may be generated on frame (38). Each geometry (42) may be contained in or touch one or more titles (40). Each geometry (42) can be a polygon having three or more vertices (44), such as exemplary vertices (44a), (44b), and (44c) [column 12, lines 19 – 24]. The geometries within each tile are considered the geometry chunks as claimed where the bounding region is the region within the tiles (claims **1**, **2**).

While the examiner agrees that Zhu et al. does not explicitly teach ***defining the geometry chunk with a bounding region when said bounding region has not already been defined for the geometry chunk in a previous frame***, this limitation does not patently differ from the prior art and additionally, does not define any new method steps as to *when* the bounding region is defined other than to say it will be defined if no bounding region exists, resulting in a negative limitation. Although Zhu et al. is silent as to predetermining the tiles (***said bounding region***), it would have been obvious to one of ordinary skill in the art at the time the invention was made to generate the tiles of Zhu et al. when needed in order to process each frame individually and to reduce the processing time.

2. Regarding to claims **9**, **10**, the rationale of claim 1 is incorporated herein. Fig. 2 is a block diagram for an exemplary embodiment of binning engine (12). Binning engine (12) generally functions to selectively bin graphics data into the various memory bins (18) [Fig. 1]. In particular, binning engine (12) operates on graphics data to determine which tiles in an image frame are touched by each geometry specified in and/or further

defined by the graphics data; from this, binning engine (12) outputs synchronized graphics data packets (14) for storage into memory bins (18), each of which is specific to a particular tile [column 5, lines 25 – 39]. The graphics data may be generated, and/or sent, by a CPU or dedicated geometry processing hardware. Graphics data comprises information that can be used to generate or produce an image. The Z-stream contains vertex (e.g., X, Y, Z coordinates) data for various geometries along with some mode data. Such vertex data can be linked according to primitives formed from the geometries (claim **9**) [column 5, lines 47 – 50]. As depicted in Fig. 2, the binning engine (12) includes a geometry buffer (22). A vertex buffer (26), which is coupled to geometry buffer (22), comprises a queue to buffer vertices for one or more polygons defined by the geometry data (claim **10**) [column 6, lines 15 – 17].

3. Zhu et al. teaches the claimed limitations of claims **11–14**, expect specifying disclosing when the bounding region is defined and multiple graphics units. However, Zhu et al. discloses a system and method implemented in hardware to optimize rendering of a computer graphics image, which may be displayed in an image frame comprising a number of tiles. Referring to Fig. 1, a binning engine (12), which is implemented in hardware separate from a host computer, receives the graphics data (claim **12**) [column 3, line 45]. It would have been obvious that the binning engine (12) includes a unit, such as the virtual graphics unit as claimed, so that the binning engine (12) has a means of receiving this graphics data (claim **13**). The graphics data may be generated by dedicated geometry hardware or a central processing unit of a host

computer (claim **14**) [column 3, lines 14 – 15]. Graphics data can include geometry data and mode data. Geometry data comprises information relating to various geometries (e.g., triangles, parallelograms, rectangles, circles, etc.) that can be processed to produce a complete image (claim **14**) [column 3, lines 19 – 24]. Using the graphics data, binning engine (12) virtually reproduces the associated geometries and modes in an image frame that comprises a number of distinct regions referred to as tiles. Binning engine (12) determines which tiles are "touched" by each geometry. For every tile, the graphics data for each geometry touching the tile is linked to the tile (claim **11**) [column 3, lines 43 – 52]. This binning engine (12) is considered the geometry distributor. As explained in claim 1, the tiles are considered the claimed subareas where the region of each tile is defined as the bounding region and the data within this region are the geometry chunks. A rendering engine (20) is coupled to memory bins (18). In general, rendering engine (2) accesses the graphics data contained in memory bins (18) to render an image for display. With the graphics data stored into separate memory bins (18) for each tile of an image frame, rendering engine (2) can readily retrieve graphics data from each bin (18) to render the relevant portion of an image within the respective tile of a frame (claim **11**) [column 4, lines 56 – 64].

As stated in the rationale from claim 1, while the examiner agrees that Zhu et al. does not explicitly teach ***defining the geometry chunk with a bounding region when said bounding region has not already been defined for the geometry chunk in a previous frame***, this limitation does not patently differ from the prior art and additionally, does not define any new method steps as to *when* the bounding region is

defined other than to say it will be defined if no bounding region exists, resulting in a negative limitation. Although Zhu et al. is silent as to predetermining the tiles (***said bounding region***), it would have been obvious to one of ordinary skill in the art at the time the invention was made to generate the tiles of Zhu et al. when needed in order to process each frame individually and to reduce the processing time. Furthermore, it would have been obvious at the time the invention was made to allow multiple graphic units to perform the same operation as the graphic unit that is disclosed by Zhu et al. because if one or more units are not available, the remaining functional units may still perform so that delay does not exist.

4. Regarding to claims **20**, **21**, Fig. 2 is a block diagram for an exemplary embodiment of binning engine (12). Binning engine (12) generally functions to selectively bin graphics data into the various memory bins (18) [Fig. 1]. In particular, binning engine (12) operates on graphics data to determine which tiles in an image frame are touched by each geometry specified in and/or further defined by the graphics data; from this, binning engine (12) outputs synchronized graphics data packets (14) for storage into memory bins (18), each of which is specific to a particular tile [column 5, lines 25 – 39]. The graphics data may be generated, and/or sent, by a CPU or dedicated geometry processing hardware. Graphics data comprises information that can be used to generate or produce an image. The Z-stream contains vertex (e.g., X, Y, Z coordinates) data for various geometries along with some mode data. Such vertex data can be linked according to primitives formed from the geometries (claim **20**)

[column 5, lines 47 – 50]. As depicted in Fig. 2, the binning engine (12) includes a geometry buffer (22). A vertex buffer (26), which is coupled to geometry buffer (22), comprises a queue to buffer vertices for one or more polygons defined by the geometry data (claim **21**) [column 6, lines 15 – 17].

Claims **1**, **3 – 5**, **8**, **11**, **15 – 19** are rejected under 35 U.S.C. 103(a) as being unpatentable over by US Patent No. 6,104,842 to Rich.

Rich discloses the limitations of claims **1**, **3 – 5**, **8**, **11**, **15 – 19** with the exception of disclosing when the bounding region is defined. However, Rich discloses a method, apparatus and computer program for transforming from model to screen coordinates by assigning specified subsets of the plurality of parallel processing elements respective model space geometric primitives.

5. In regards to claim **1**, **8**, and **19**, the image generation system (20) illustrated in Fig. 1 is provided with object models by a controlling process executing in the host processor (22) that selects object models as necessary, and provides a list of objects (claims **8**, **19**) to the image generation system (20) [column 6, lines 18 – 19]. Referring to Figs. 3, 4, and 5, a database of model elements that comprise the screen image to be generated is constructed by the host processor in model coordinates. The image generation system then carries out four functions to convert the model in the database to an image in the frame buffer. These four functions are geometric processing, rasterization, shading/texturing and composition [column 8, lines 15 – 20]. After each of

the desired operations reflected in block (52) have been carried out, the processing elements (32) write the list of transformed primitives to external memory in clock (53) [column 8, lines 53 – 54]. Because the screen is divided into a number of regions (claim **1**), a list for each region is generated which lists the primitives (claim **1**) that touch that region. This list is written to external memory as seen in block (54) [column 8, lines 59 – 62]. These regions are considered the claimed subareas and the primitives the geometry chunks where the bounding region is the area that the primitives are located in. A frame is a complete set of information required to provide a screen with enough data to present visual information (claim **1**) [column 6, lines 14 – 15]. This frame is considered the compositing window as claimed.

While the examiner agrees that Rich does not explicitly teach ***defining the geometry chunk with a bounding region when said bounding region has not already been defined for the geometry chunk in a previous frame***, this limitation does not patently differ from the prior art and additionally, does not define any new method steps as to *when* the bounding region is defined other than to say it will be defined if no bounding region exists, resulting in a negative limitation. Although Rich is silent as to predetermining the regions (***said bounding region***), it would have been obvious to one of ordinary skill in the art at the time the invention was made to generate the regions of Rich when needed in order to process each frame individually and to reduce the processing time.

Regarding claims **3 – 5**, **15-17** the rationale of claim 1 is incorporated herein. Fig. 1 illustrates an integrated image generation system (20) that communicates with a host processor (22), video memory (24) and a display device (26). The integrated image generation system (20) receives information from the host processor (22) from which the image generation system (20) generates an image to be displayed on the display device (26) [column 5, lines 43 – 49]. A software model of objects to be displayed is created with the host processor (22). An object is a two or three dimensional software model of a thing that is to be displayed. Objects may be composed of polygons, which are portions of planes defied by three or more vertices in a three dimensional coordinate system (claim **5**, **17**) [column 5, lines 51 – 55]. The polygons of the object models may be defined in a three-dimensional space, often called "world" or "model" coordinates, and texture patterns or "texture maps" are defined in a two-dimensional space for each pattern (claim **4**, **16**). The image generation system (20) receives or obtains models generated by the host processor (22) and operates on those models to create an array of picture elements of "pixels" which are in two-dimensional space referred to as "x-y space" or "screen coordinates (claim **3**, **15**) [column 6, lines 1 – 5]. As stated in the rationale of claim 1, while the examiner agrees that Rich does not explicitly teach ***defining the geometry chunk with a bounding region when said bounding region has not already been defined for the geometry chunk in a previous frame***, this limitation does not patently differ from the prior art and additionally, does not define any new method steps as to *when* the bounding region is defined other than to say it will be defined if no bounding region exists, resulting in a negative limitation. Although Rich is

silent as to predetermining the regions (***said bounding region***), it would have been obvious to one of ordinary skill in the art at the time the invention was made to generate the regions of Rich when needed in order to process each frame individually and to reduce the processing time.

6. In regards to claims **11**, **18**, the rationale of claim 1 is incorporated herein. Illustrated in Fig. 2, the image generation system (20) includes a plurality of processing elements (32), which make up a processing element array (30). These processing elements (32) operate as a single instruction, multiple data processing array so that the same processing instruction is supplied to multiple individual processors, but each processor operates on a different data stream [column 6, lines 38 – 46]. Each processing element (32) is assigned to a separate pixel [column 6, line 68]. The processing element array element control unit (40) is primarily responsible for sequencing instructions and address to the processing element array (30) (claim **11**) [column 7, lines 1 – 3]. Referring to Fig. 16B, a region (132) is shown to be divided into four subregions (136). In the present example, each subregions (136) comprises a two dimensional array of 16 pixels wide and 16 pixels deep. The regional and subregional organizations as shown in Figs. 16A and 16B are based upon a processing element hardware allotment of 256 [column 27, lines 62 – 68] processing elements, however, other numbers of processing elements and region dimension may be utilized (claims **11**, **18**) [column 28, lines 1 – 2].

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle K. Lay whose telephone number is (571) 272-7661. The examiner can normally be reached on Monday - Friday, 7:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi can be reached on (571) 272-7664. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michelle K. Lay
Patent Examiner
Art Unit 2672

09.29.2005 mkl

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